



(11)

EP 0 800 307 A3

(12)

EUROPEAN PATENT APPLICATION

(88) Date of publication A3  
16.09.1998 Bulletin 1998/38

(51) Int Cl<sup>6</sup> H04N 1/047

(43) Date of publication A2  
08.10.1997 Bulletin 1997/41

(21) Application number. 97302270.0

(22) Date of filing 02.04.1997

(84) Designated Contracting States  
DE FR GB

(30) Priority. 04.04.1996 US 627625

(71) Applicant: Hewlett-Packard Company  
Palo Alto, California 94304 (US)

(72) Inventor Tullis, Barclay J.  
Palo Alto, CA 94303 (US)

(74) Representative: Jehan, Robert et al  
Williams, Powell & Associates,  
4 St Paul's Churchyard  
London EC4M 8AY (GB)

(54) Method and device for achieving high contrast surface illumination

(57) A method and device for acquiring data related to topography of a medium (14 and 44) includes projecting light, allowably from more than one direction, onto the surface of the medium at an angle (112 and 114) of less than sixteen degrees relative to the surface and imaging the surface. For example, the imaging sensor (24 and 26: 73) may be an array of sensor elements that is used to determine navigation of a hand-held scanner along an original. By introducing light at an angle of less than sixteen degrees, surface irregularities cast shadows that form a high contrast illumination pattern along

the surface of the medium. The navigation sensor detects multi-element variations (64) of intensity of scattered light from the surface with respect to positions along the surface, so that the Nyquist criteria are adequately satisfied. Typically, the light is collimated incoherent light, but this is not critical. The illumination angle can be established by using a prism (31, 38). The prism may have an antireflective thin film coating on one or more prism faces. The employment of a prism provides a number of advantages, such as use of a transparent surface in contact with the media and raising the illumination source(s) away from the media.

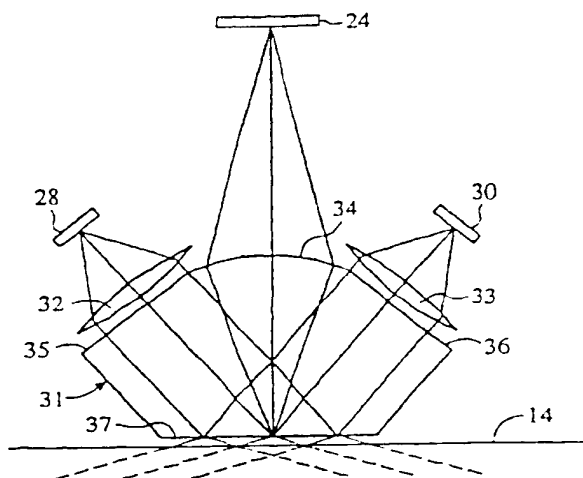


FIG. 4

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European Patent  
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# EUROPEAN SEARCH REPORT

Application Number  
EP 97 30 2270

## DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevance code	CLASSIFICATION OF THE APPLICATION (Int. Cl. 6)
A	US 4 882 629 A (FAULKERSON JAMES L ET AL) 21 November 1939 * column 4, line 59 - column 6, line 46 * * column 14, line 9 - line 36 *	1.8	H04N1/047
A	US 4 019 066 A (LUCAS JOHN M ET AL) 19 April 1977 * abstract * * column 5, line 47 - line 61 *	1.6	
A	DE 35 44 871 A (SICK OPTIK ELEKTRONIK ERWIN) 11 September 1986 * page 13, line 26 - line 29 * * page 16, line 1 - line 36 * * page 19, line 21 - line 27; figure 1 *	1.8	
D, A	US 5 149 980 A (BALDWIN RICHARD R ET AL) 22 September 1992 * abstract *	1.8	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl. 6)
			H04N G01B G01N
Place of search		Date of completion of the search	Examiner
THE HAGUE		30 July 1998	Hazel, J
CATEGORY OF CITED DOCUMENTS			
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<p>T: theory or principle underlying the invention; E: earlier patent document, but published on or after the filing date; D: document cited in the application; L: document cited for other reasons; &amp;: member of the same patent family, corresponding document</p>			